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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,773	08/08/2006	Toshihiro Iwakuma	292948US0PCT	4654
22850 7590 10/27/2010 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER YANG, JAY	
			ART UNIT	PAPER NUMBER
			1786	
			NOTIFICATION DATE	DELIVERY MODE
			10/27/2010	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/588,773	<b>Applicant(s)</b> IWAKUMA ET AL.	
	<b>Examiner</b> J. L. YANG	<b>Art Unit</b> 1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 and 21-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>06/01/10; 07/06/10</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This Office Action is in response to the Applicant's Amendment filed 06/01/10.

#### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/01/10 has been entered.

#### ***Response to Amendment***

1. The rejection of Claim 23 under 35 U.S.C. 102(b) as being anticipated by Higashi et al. (US 6,617,051 B1) in the Office Action filed 12/30/09 is overcome by amendment.

#### ***Claim Rejections – 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

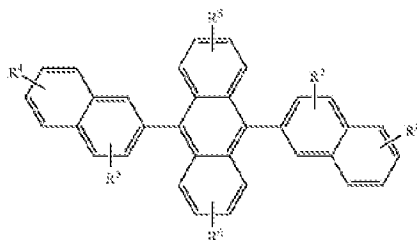
3. Claims 1-6, 8-10, 12, 14-19, and 21- 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higashi et al. (US 6,617,051 B1) and further in view of Begley et al. (US 2005/0095453 A1).

Regarding Claims 1-5, 17, 19, 21, and 23, Higashi et al. discloses an organic EL device comprising an organic compound layer including an organic emitting layer sandwiched between a pair of electrodes, in which that organic compound layer is formed from an organic compound material having an impurity concentration of 0 ppm (col. 46, Claim 17) which is in a range within 0-1000 ppm (col. 32, lines 39-49). Higashi et al. discloses a doping method for efficient mixed emission using a host material and a fluorescent dye dopant for the light-emitting layer (col. 22, lines 33-38). Higashi, et al. further discloses that the impurities in the organic compound material (including the host) include halogen compounds (col. 29, lines 59-63). Higashi et al., however, does not disclose a dopant that is a phosphorescent organic metal complex.

Begley et al. discloses a light-emitting layer of an organic EL device comprising of a host material doped with a guest compound, in which the dopant can be chosen from phosphorescent metal complexes ([0115]). It would have been obvious to one of

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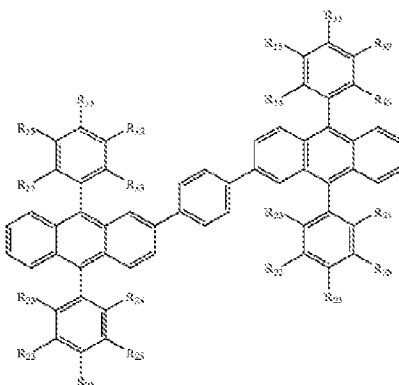
ordinary skill in the art at the time of the invention to substitute the phosphorescent dopant for the dopants in the organic EL device as disclosed by Higashi et al. The motivation is provided by the fact that the use of phosphorescent dopants is known as disclosed by Begley et al. ([0115]), and in addition to the fact that the host material as disclosed by Higashi et al. (col. 10) is sufficiently similar to the anthracene derivatives as disclosed by Begley et al:



(page 11) in which  $R^1$  = fused to produce a secondary anthracene group ([0140]), rendering the substitution predictable with a reasonable expectation of success. It should be noted that the method of detecting impurities in the organic EL device as described in Claim 17, in which "the halogen element mass concentrations described above is identified respectively by inductively coupled plasma-mass spectrometry (ICP-MS analysis) or a coulometric titration method" adds no further limitations to this claim and thus does not differentiate it from the prior art.

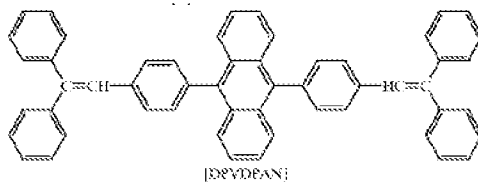
Regarding Claims 6, 8, 12, and 14, Higashi et al. discloses the following host material in the light-emitting layer:

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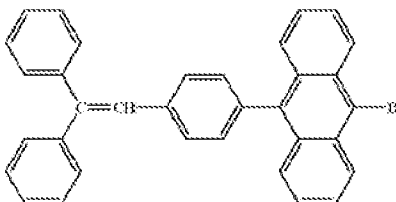


(col. 10) where  $R_{11} - R_{25}$  = alkyl such that  $Ar' = \text{phenylene}$ ,  $R_A = R_B = \text{aromatic hydrocarbon group with 14 carbon ring atoms substituted with 2 phenyl groups}$ .

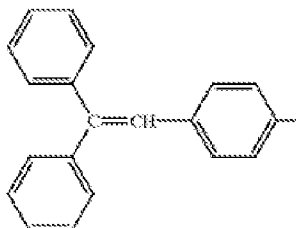
Regarding Claims 9, 10, 15, and 16, Higashi et al. discloses the following compound for host material (as well as light-emitting material) in the light-emitting layer:



(col. 38) and subsequently discloses in its synthesis the possibility of producing the following impurity that can be present:



(col. 39) such that  $Ar = Ar' = \text{anthracene}$ ,  $X_1 = \text{Br}$ ,  $R_A = \text{shown below}$ :



, and  $X_2 = H$  such that it satisfies Formula (3) of Claim 9 and Formula (6) of Claim 10.

Regarding Claim 18, Higashi et al. discloses an electron transport/injection material Alq that is placed adjacent (col. 3, lines 20-21) to the light-emitting layer that is free from any impurities (pure, col. 41, Table 2, Examples 1-7).

Regarding Claim 22, Higashi et al. discloses a wide variety of light-emitting material for the light-emitting layer (col. 9-10) for an organic EL device such that its halogen impurity as mentioned above in the 102(b) rejection is between 0-1000 ppm (col. 32, lines 39-49). Higashi, et al., however, does not disclose a phosphorescent organic metal complex. Begley et al. discloses the use of phosphorescent metal complexes for organic EL devices as light-emitting material (dopants) ([0115]) that can be substituted as described above with proper motivation.

Regarding Claim 24, Higashi et al. discloses an organic EL device comprising an organic compound layer including an organic emitting layer sandwiched between a pair of electrodes. Higashi et al. discloses a doping method for efficient mixed emission using a host material and a fluorescent dye dopant for the organic emitting layer (col. 22, lines 33-38), in which the host material meets the limitations of Claim 23 as

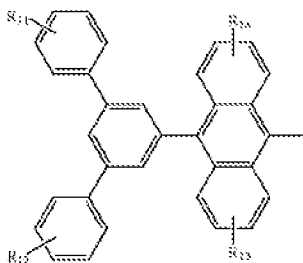
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described above in the 102(b) rejection, and also such that the halogen impurity concentration of the light-emitting material (dopant) is between 0-1000 ppm (col. 32, lines 39-49). Higashi et al., however, does not disclose a phosphorescent organic metal complex. Begley et al. discloses the phosphorescent organic metal complex as a light-emitting material (dopant) as described above.

3. Claims 7, 11, and 13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Higashi et al. (US 6,617,051 B1) and further in view of Begley et al. (US 2005/0095453 A1) and Hu et al. (US 6,479,172 B2).

Higashi et al. in view of Begley et al. disclose the organic EL device as described in Claim 6. They do not, however, disclose an aromatic hydrocarbon represented by Formula (1) where Ar = benzentriyl, pyridinetriyl, pyrimidinetriyl, or triazinetriyl and R<sub>A</sub>, R<sub>B</sub>, and R<sub>C</sub> represent independently a substituted or non-substituted aromatic hydrocarbon group having 6-30 ring carbon atoms, a substituted or non-substituted aromatic heterocyclic group having 3-20 ring carbon atoms or a substituted or non-substituted amino group, and where R<sub>A</sub>, R<sub>B</sub>, and R<sub>C</sub> each may be the same or different, and adjacent ones may be combined with each other.

Hu et al. discloses the following compound:





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(col. 6) with  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$ , and  $R_{14} = H$  such that Ar = benzentriyl,  $R_A = \text{phenyl}$ ,  $R_B = \text{phenyl}$ ,  $R_C = \text{anthracene group}$  as a hydrocarbon compound for host material for an organic EL device (col. 4, lines 16-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the host material as disclosed by Hu et al. for the host material as disclosed by Higashi et al. in view of Begley et al. The motivation is provided by the fact that the compound as disclosed by Higashi et al. is a known host material for an organic EL device that is similarly an aromatic hydrocarbon comprising an anthracene group, rendering the substitution predictable with a reasonable expectation of success.

### ***Response to Arguments***

1. The Applicant has argued that Higashi et al. fails to describe a phosphorescent dopant material. However, it should be noted that the use of phosphorescent and fluorescent dopants are widely known in the art (Begley et al., [0115]). Furthermore, it is the position of the Examiner that the substitution of the phosphorescent dopant as disclosed by Begley et al. would be predictable with a reasonable expectation of success due to the similarity of the disclosed host material of both Higashi et al. and Begley et al. which can both involve multiply-bonded anthracene derivatives (see the rejection above).

2. The Applicant argues on pages 15-17 the novelty of the invention by citing unexpected results regarding enhanced lifetimes upon purification. However, it should

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be noted that Higashi et al. clearly discloses the desirability of obtaining purity of the organic compounds used in the construction of the organic EL device (col. 1, lines 55-60), particularly the desirability of reducing the halide-containing impurities (Claims 2, 11; col. 2, lines 10-15), thus rendering the enhanced lifetime data as disclosed by the Applicant expected over the prior art.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. L. YANG whose telephone number is (571)270-1137. The examiner can normally be reached on Monday to Thursday from 8:30 am to 6:00 pm Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on (571)272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1786

/J. Y./  
Examiner, Art Unit 1786